



[4910-13-P]

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 39**

**[Docket No. FAA-2018-0871; Product Identifier 2018-NE-24-AD; Amendment 39-19511; AD 2018-25-01]**

**RIN 2120-AA64**

**Airworthiness Directives; Rolls-Royce plc Turbofan Engines**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final rule; request for comments.

**SUMMARY:** We are superseding airworthiness directive (AD) 2018-13-07 for all Rolls-Royce plc (RR) Trent 1000-A, Trent 1000-C, Trent 1000-D, Trent 1000-E, Trent 1000-G, and Trent 1000-H turbofan engine models. AD 2018-13-07 required initial inspections of the intermediate-pressure compressor (IPC) stage 1 rotor blades, IPC stage 2 rotor blades, and IPC shaft stage 2 dovetail posts, and removing any cracked parts from service. This AD requires initial inspections and adds repetitive inspections of the IPC stage 1 rotor blades, IPC stage 2 rotor blades, and IPC shaft stage 2 dovetail posts, and removing any cracked parts from service. This AD was prompted by the manufacturer determining the need for repetitive inspections of the IPC stage 1 rotor blades, IPC stage 2 rotor blades, and IPC shaft stage 2 dovetail posts. We are issuing this AD to address the unsafe condition on these products.

**DATES:** This AD is effective [INSERT DATE 15 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

The Director of the Federal Register approved the incorporation by reference of a certain publication listed in this AD as of [INSERT DATE 15 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

We must receive any comments on this AD by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

- Federal eRulemaking Portal: Go to <http://www.regulations.gov>. Follow the instructions for submitting comments.
- Fax: 202-493-2251.
- Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590.
- Hand Delivery: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

For service information identified in this final rule, contact Rolls-Royce plc, Corporate Communications, P.O. Box 31, Derby, England, DE24 8BJ; phone: 011-44-1332-242424; fax: 011-44-1332-249936; email: [corporate.care@rolls-royce.com](mailto:corporate.care@rolls-royce.com); Internet: <https://customers.rolls-royce.com/public/rollsroycecare>. You may view this service information at the FAA, Engine & Propeller Standards Branch, 1200 District Avenue, Burlington, MA, 01803. For information on the availability of this material at the FAA, call 781-238-7759. It is also available on the internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2018-0871.

#### **Examining the AD Docket**

You may examine the AD docket on the Internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2018-0871; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

The AD docket contains this AD, the mandatory continuing airworthiness information, regulatory evaluation, any comments received, and other information. The street address for Docket Operations (phone: 800-647-5527) is listed above. Comments will be available in the AD docket shortly after receipt.

**FOR FURTHER INFORMATION CONTACT:** Kevin M. Clark, Aerospace Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA, 01803; phone: 781-238-7088; fax: 781-238-7199; email: kevin.m.clark@faa.gov.

#### **SUPPLEMENTARY INFORMATION:**

##### **Discussion**

We issued AD 2018-13-07, Amendment 39-19319 (83 FR 34758, July 23, 2018), (“AD 2018-13-07”), for all RR Trent 1000-A, Trent 1000-C, Trent 1000-D, Trent 1000-E, Trent 1000-G, and Trent 1000-H turbofan engine models. AD 2018-13-07 required inspecting the IPC stage 1 rotor blades, IPC stage 2 rotor blades, and IPC shaft stage 2 dovetail posts, and removing any cracked parts from service. AD 2018-13-07 resulted from crack findings on the IPC rotor blades and IPC shaft stage 2 dovetail posts, which could lead to rotor blade separations resulting in engine failures. We issued AD 2018-13-07 to prevent failure of the IPC, which could result in failure of one or more engines, loss of thrust control, and loss of the airplane.

##### **Actions Since AD 2018-13-07 was Issued**

Since we issued AD 2018-13-07, the manufacturer determined the need for repetitive inspections of the IPC stage 1 rotor blades, IPC stage 2 rotor blades, and IPC shaft stage 2 dovetail posts. Also, since we issued AD 2018-13-07, the European Aviation Safety Agency (EASA) issued AD 2018-0167R2, dated October 16, 2018, which requires initial and repetitive inspections of the IPC stage 1 rotor blades, IPC stage 2 rotor blades, and IPC shaft stage 2 dovetail posts. We are issuing this AD to address the unsafe condition on these products.

### **Related Service Information under 1 CFR Part 51**

We reviewed RR Alert Non-Modification Service Bulletin (NMSB) Trent 1000 72-AK130, Revision 2, dated July 26, 2018, and RR Alert NMSB Trent 1000 72-K132, dated June 29, 2018. RR Alert NMSB Trent 1000 72-AK130 describes procedures for performing initial and repetitive inspections of the IPC stage 1 rotor blades, IPC stage 2 rotor blades, and IPC shaft stage 2 dovetail posts, and lists engine serial numbers. RR Alert NMSB Trent 1000 72-K132, describes procedures for replacement of the IPC stage 1 rotor blades, IPC stage 2 rotor blades, and the IP compressor drum during refurbishment. This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in the ADDRESSES section.

### **Other Related Service Information**

We reviewed RR NMSB Trent 1000 72-K099, Initial Issue, dated June 11, 2018; RR NMSB Trent 1000 72-K099, Revision 1, dated July 3, 2018; RR NMSB Trent 1000 72-K100, Initial Issue, dated June 11, 2018; RR NMSB Trent 1000 72-K129, Initial Issue, dated June 11, 2018; and RR NMSB Trent 1000 72-K129, Revision 1, dated July 2, 2018. RR NMSB Trent 1000 72-K099, Initial Issue, and RR NMSB Trent 1000 72-K099, Revision 1, describe procedure for an ultrasonic inspection of the IPC stage 1 rotor blades. RR NMSB Trent 1000 72-K100 Initial Issue describes procedures for a visual borescope inspection of the IPC stage 2 rotor blades and IPC shaft stage 2 dovetail posts. RR NMSB Trent 1000 72-K129, Initial Issue, and RR NMSB Trent 1000 72-K129, Revision 1, describe procedures for an ultrasonic inspection of the IPC stage 2 rotor blades.

### **FAA's Determination**

This product has been approved by EASA and is approved for operation in the United States. Pursuant to our bilateral agreement with the European Community, EASA

has notified us of the unsafe condition described in the MCAI and service information referenced above. We are issuing this AD because we evaluated all the relevant information and determined the unsafe condition described previously is likely to exist or develop in other products of the same type design.

### **AD Requirements**

This AD requires initial and repetitive inspections of the IPC stage 1 rotor blades, IPC stage 2 rotor blades, and IPC shaft stage 2 dovetail posts, and removing any cracked parts from service.

### **Differences Between this AD and the MCAI or Service Information**

This AD allows inspections of any affected IPC part to be completed within 15 days of the effective date of this AD. EASA AD 2018-0167R2, dated October 16, 2018, and RR Alert NMSB Trent 1000 72-AK130, Revision 2, dated July 26, 2018, allow certain affected IPC parts to be completed within 45 days of the effective date of EASA AD 2018-0167R1. We expect most operators to have already complied with EASA AD and find that completing the inspections within 15 days of the effective date of this AD provides an appropriate level of safety.

### **Interim Action**

We consider this AD interim action. The manufacturer is still reviewing this unsafe condition and may develop follow-on actions.

### **FAA's Justification and Determination of the Effective Date**

No domestic operators use this product. Therefore, we find that notice and opportunity for prior public comment are unnecessary and that good cause exists for making this amendment effective in less than 30 days.

### **Comments Invited**

This AD is a final rule that involves requirements affecting flight safety, and we did not provide you with notice and an opportunity to provide your comments before it

becomes effective. However, we invite you to send any written data, views, or arguments about this final rule. Send your comments to an address listed under the ADDRESSES section. Include the docket number FAA-2018-0871 and product identifier 2018-NE-24-AD at the beginning of your comments. We specifically invite comments on the overall regulatory, economic, environmental, and energy aspects of this final rule. We will consider all comments received by the closing date and may amend this final rule because of those comments.

We will post all comments we receive, without change, to <http://www.regulations.gov>, including any personal information you provide. We will also post a report summarizing each substantive verbal contact we receive about this final rule.

### **Costs of Compliance**

We estimate that this AD affects 0 engines installed on airplanes of U.S. registry.

We estimate the following costs to comply with this AD:

#### **Estimated costs**

<b>Action</b>	<b>Labor cost</b>	<b>Parts cost</b>	<b>Cost per product</b>	<b>Cost on U.S. operators</b>
Inspect IPC blades and dovetail post	20 work-hours X \$85 per hour = \$1700	\$0	\$1,700	\$0

We estimate the following costs to do any necessary replacements that would be required based on the results of the inspection. We have no way of determining the number of aircraft that might need these replacements:

#### **On-condition costs**

<b>Action</b>	<b>Labor cost</b>	<b>Parts cost</b>	<b>Cost per product</b>
Replace IPC Stage 1 Rotor blade	0 work-hours X \$85 per hour = \$0	\$1,528	\$1,528

Replace IPC Stage 2 Rotor blade	0 work-hours X \$85 per hour = \$0	\$993	\$993
Replace IPC 1-8 drum	0 work-hours X \$85 per hour = \$0	\$1,365,219	\$1,365,219

### **Authority for this Rulemaking**

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, Section 106, describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701, "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

This AD is issued in accordance with authority delegated by the Executive Director, Aircraft Certification Service, as authorized by FAA Order 8000.51C. In accordance with that order, issuance of ADs is normally a function of the Compliance and Airworthiness Division, but during this transition period, the Executive Director has delegated the authority to issue ADs applicable to engines, propellers, and associated appliances to the Manager, Engine and Propeller Standards Branch, Policy and Innovation Division.

### **Regulatory Findings**

This AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the

national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Is not a “significant rule” under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979),
- (3) Will not affect intrastate aviation in Alaska, and
- (4) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

#### **List of Subjects in 14 CFR Part 39**

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

#### **Adoption of the Amendment**

Accordingly, under the authority delegated to me by the Administrator, the FAA amends part 39 of the Federal Aviation Regulations (14 CFR part 39) as follows:

#### **PART 39 - AIRWORTHINESS DIRECTIVES**

- 1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

#### **§ 39.13 [Amended]**

- 2. The FAA amends § 39.13 by removing airworthiness directive (AD) 2018-13-07, Amendment 39-19319 (83 FR 34758, July 23, 2018), and adding the following new AD:

2018-25-01 **Rolls-Royce plc**: Amendment 39-19511; Docket No. FAA-2018-0871; Product Identifier 2018-NE-24-AD.

#### **(a) Effective Date**

This AD is effective [INSERT DATE 15 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].



**(b) Affected ADs**

This AD replaces AD 2018-13-07, Amendment 39-19319 (83 FR 34758, July 23, 2018).

**(c) Applicability**

This AD applies to all Rolls Royce plc (RR) Trent 1000-A, Trent 1000-C, Trent 1000-D, Trent 1000-E, Trent 1000-G, and Trent 1000-H turbofan engine models.

**(d) Subject**

Joint Aircraft System Component (JASC) Code 7230, Turbine Engine Compressor Section.

**(e) Unsafe Condition**

This AD was prompted by reports of intermediate-pressure compressor (IPC) rotor blade cracks, which could lead to rotor blade separations resulting in engine failures. We are issuing this AD to prevent failure of the IPC. The unsafe condition, if not addressed, could result in failure of one or more engines, loss of thrust control, and loss of the airplane.

**(f) Compliance**

Comply with this AD within the compliance times specified, unless already done.

**(g) Required Actions**

(1) Within 15 days of the effective date of this AD, or within the compliance times specified in Table 1 of RR Alert Non-Modification Service Bulletin (NMSB) Trent 1000 72-AK130, Revision 2, dated July 26, 2018, whichever occurs later, perform on-wing inspection of the IPC stage 1 rotor blades in accordance with paragraph 3.A.(1) of RR Alert NMSB Trent 1000 72-AK130.

(2) Repeat the on-wing inspection of the IPC stage 1 rotor blades in accordance with paragraph 3.A.(1) of RR Alert NMSB Trent 1000 72-AK130, Revision 2, dated July 26, 2018, and within the compliance times specified in Table 1 of that NMSB.

(3) Within 15 days of the effective date of this AD, or within the compliance times specified in Table 1 of RR Alert NMSB Trent 1000 72-AK130 Revision 2, dated July 26, 2018, whichever occurs later, perform on-wing inspection of the IPC stage 2 rotor blades and IPC shaft stage 2 dovetail posts in accordance with paragraph 3.B.(1) and 3.C.(1) of RR Alert NMSB Trent 1000 72-AK130.

(4) Repeat the on-wing inspection of the IPC stage 2 rotor blades and IPC shaft stage 2 dovetail posts in accordance with paragraphs 3.B.(1) and 3.C.(1) of RR Alert NMSB Trent 1000 72-AK130, Revision 2, dated July 26, 2018, and within the compliance times specified in Table 1 of RR Alert NMSB Trent 1000 72-AK130.

(5) For the on-wing inspection required by paragraphs (g)(1) through (4) of this AD, provided the stated thresholds and intervals are not exceeded, you may substitute:

(i) an in-shop inspection of an engine or module performed in accordance with the instructions of paragraphs 3.A.2, 3.B.2, and 3.C.2 of the RR Alert NMSB Trent 1000 72-AK130, Revision 2, dated July 26, 2018; or

(ii) an in-shop piece part inspection during refurbishment in accordance with the Accomplishment Instructions, paragraphs 3.B.(2)(f)(vi), 3.B.(2)(g)(v), and 3.B.(3)(d)(iii) of RR Trent 1000 NMSB 72-K132, dated June 29, 2018.

(6) If any IPC stage 1 rotor blade, IPC stage 2 rotor blade, or an IPC shaft stage 2 dovetail post is found cracked during any inspection required by this AD, remove the part from service and replace the part with a part eligible for installation before further flight.

**(h) Inspection After Operation Under Asymmetric Power**

As of the effective date of this AD, before the next flight after each occurrence where engine operation in asymmetric power conditions was sustained for more than 30 minutes at less than 25,000 feet, either resulting from engine power reduction, or from engine in-flight shut-down (IFSD), inspect the IPC stage 1 rotor blades, stage 2 rotor blades and IPC shaft stage 2 dovetail posts in accordance with the paragraphs 3.A.(1),

3.B.(1), and 3.C.(1) of the RR Alert NMSB Trent1000 72-AK130, Revision 2, dated July 26, 2018 on the engine that did not experience the power reduction or IFSD installed on the airplane.

**(i) Credit for Previous Actions**

You may take credit for the inspections required by paragraph (g)(1) and (3) of this AD if you performed these inspections before the effective date of this AD using RR Alert NMSB Trent 1000 72-AK130, Revision 1, dated June 29, 2018, or RR Alert NMSB Trent 1000 72-AK130, Initial Issue, dated June 11, 2018.

**(j) Special Flight Permits**

(1) Special flight permits, as described in Section 21.197 and Section 21.199 of the Federal Aviation Regulations (14 CFR 21.197 and 21.199), are subject to the requirements of paragraph (k)(1)(i) of this AD.

(i) Operators who are prohibited from further flight due to an IPC stage 1 rotor blade, IPC stage 2 rotor blade, or an IPC shaft stage 2 dovetail post being found cracked, may perform a one-time non-revenue ferry flight to a location where the engine can be removed from service. This ferry flight must be performed without passengers, involve non-extended operations (ETOPS), and consume no more than three flight cycles.

(ii) [Reserved]

(2) [Reserved]

**(k) Alternative Methods of Compliance (AMOCs)**

(1) The Manager, ECO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (l)(1) of this AD. You may email your request to: ANE-AD-AMOC@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

**(l) Related Information**

(1) For more information about this AD, contact Kevin M. Clark, Aerospace Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA, 01803; phone: 781-238-7088; fax: 781-238-7199; email: kevin.m.clark@faa.gov.

(2) Refer to European Aviation Safety Agency (EASA) AD 2018-0167R2, dated October 16, 2018, for more information. You may examine the EASA AD in the AD docket on the Internet at <http://www.regulations.gov> by searching for and locating it in Docket No. FAA-2018-0871.

**(m) Material Incorporated by Reference**

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) Rolls-Royce plc (RR) Alert Non-Modification Service Bulletin (NMSB) Trent 1000 72-AK130, Revision 2, dated July 26, 2018.

(ii) RR Alert NMSB Trent 1000 72-K132, dated June 29, 2018.

(3) For RR service information identified in this AD, contact Rolls-Royce plc, Corporate Communications, P.O. Box 31, Derby, England, DE24 8BJ; phone: 011-44-1332-242424; fax: 011-44-1332-249936; email: corporate.care@rolls-royce.com; Internet: <https://customers.rolls-royce.com/public/rollsroycecare>.

(4) You may view this service information at FAA, Engine & Propeller Standards Branch, 1200 District Avenue, Burlington, MA, 01803. For information on the availability of this material at the FAA, call 781-238-7759.

(5) You may view this service information at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: <http://www.archives.gov/federal-register/cfr/ibr-locations.html>.

Issued in Burlington, Massachusetts, on November 28, 2018.

Robert J. Ganley,  
Manager, Engine & Propeller Standards Branch,  
Aircraft Certification Service.  
[FR Doc. 2018-26393 Filed: 12/4/2018 8:45 am; Publication Date: 12/6/2018]